

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~striketrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please AMEND claims 1, 8, 16-18 and 28-31, and CANCEL claims 9-11 in accordance with the following:

1. (Currently Amended) A wireless sensor system comprising:
a plurality of sensors to detect respective parameters to be detected;
a sensor signal transmitter to transmit wireless sensor signals outputted respectively from the sensors;
a plurality of electric power receivers to receive wirelessly an electric operating power required to drive the sensors and the sensor signal transmitter;
a sensor signal receiver to receive the sensor signals transmitted from the sensor signal transmitter; and
an electric power transmitter to transmit the electric operating power wirelessly to the electric power receiver,
wherein only one sensor signal receiver is provided for commonly receiving the sensor signals from the plural sensors,
only one electric power transmitter is provided for commonly transmitting the electric operating power wirelessly to the plural electric power receivers, and
the electric power receiver supplies directly the sensors and the sensor signal transmitter with the electric operating power, and
the sensor signal receiver includes a single variable tuning circuit for varying to tune to each of natural frequencies transmitted respectively from the plural sensors and a switching element to switch among varying natural frequencies of the tuning circuit to select the natural frequencies one at a time on a time sharing basis.

2. (Previously Presented) The wireless sensor system as claimed in claim 1, wherein the sensor signal receiver has a capability of receiving the sensor signals from the respective sensors, which are transmitted by the sensor signal transmitter, and the electric power

transmitter is disposed in a sensor signal receiving unit including the sensor signal receiver.

3. (Previously Presented) The wireless sensor system as claimed in claim 1, further comprising a plurality of wireless sensor units each including the sensors, the sensor signal transmitter and the electric power receiver.

4. (Previously Presented) The wireless sensor system as claimed in claim 1, further comprising a single wireless sensor unit including the sensor, the sensor signal transmitter and the electric power receiver,

wherein the plural sensors are provided in this single wireless sensor unit, and
the sensor signal transmitter is operable to transmit wireless the sensor signals outputted from the plural sensors.

5. (Previously Presented) The wireless sensor system as claimed in claim 3, wherein some or all of the plural wireless sensor units each include the plural sensors, and

the respective sensor signal transmitters in such some or all of the wireless sensor units are operable to transmit wirelessly the sensor signals outputted from the sensors.

6. (Previously Presented) The wireless sensor system as claimed in claim 3, wherein the plural wireless sensor units are mounted on different bearings in a machine plant.

7. (Original) The wireless sensor system as claimed in claim 3, wherein at least one of the plural wireless sensor units includes the sensor utilized as a tire pressure sensor for an automotive vehicle or a rotation sensor for a wheel support bearing assembly.

8. (Currently Amended) A wireless sensor system comprising:
a plurality of wireless sensor units corresponding to respective different types of parameters to be detected and arranged in the proximity of a bearing assembly, each of the wireless sensor units including an electric power receiver having a tuning circuit and a detecting and rectifying circuit to secure an electric operating power from an electromagnetic wave of a predetermined power feeding frequency, a sensor to detect a parameter to be detected, and a sensor signal transmitter to transmit a signal outputted from the sensor as a wireless sensor signal in the form of an electromagnetic wave of a natural frequency different from the power feeding frequency; and

a sensor signal receiving unit to supply wirelessly the electric operating power to each of those wireless sensor units and to receive a sensor signal transmitted from each of those wireless sensor units, the sensor signal receiving unit including an electric power transmitter to transmit wirelessly the electromagnetic wave of the predetermined power feeding frequency and only one sensor signal receiver to receive the wireless sensor signal of the natural frequency that is transmitted wirelessly from each of the wireless sensor units,

wherein at least one of the wireless sensor units is provided with a plurality of sensors and a signal coordinator to process respective outputs from the sensors so that the sensor signals are discriminately received by the sensor signal receiver, and

only one sensor signal receiving unit is provided for commonly receiving the sensor signals from the plural sensors and for commonly transmitting the electromagnetic wave to the plural electric power receivers, and

the sensor signal receiver includes a single variable tuning circuit for varying to tune to each of natural frequencies transmitted respectively from the plural sensors and a switching element to switch among varying natural frequencies of the tuning circuit to select the natural frequencies one at a time on a time sharing basis.

9-11. (Cancelled)

12. (Previously Presented) The wireless sensor system as claimed in claim 8, wherein the electromagnetic wave for power feeding has a plane of polarization that is different from that of the electromagnetic wave of the wireless sensor signal.

13. (Previously Presented) The wireless sensor system as claimed in claim 8, wherein the respective electromagnetic waves of the wireless sensor signals transmitted from the associated wireless sensor units have different planes of polarization.

14. (Previously Presented) The wireless sensor system as claimed in claim 8, wherein the plural wireless sensor units are mounted on different bearings in a machine plant.

15. (Previously Presented) The wireless sensor system as claimed in claim 8, wherein at least one of the plural wireless sensor units includes the sensor utilized as a tire pressure sensor for an automotive vehicle or a rotation sensor for a wheel support bearing assembly.

16. (Currently Amended) A bearing assembly equipped with a wireless sensor unit, comprising:

a plurality of wireless sensor units mounted on a bearing, each of the wireless sensor units including:

a sensor to detect a parameter to be detected;

a sensor signal transmitter to transmit wirelessly a sensor signal outputted from the sensor; and

an electric power receiver to receive wirelessly an electric operating power required to drive the sensor and the sensor signal transmitter,

wherein the plural wireless sensor units are operable to transmit to one common sensor signal receiver the respective sensor signals transmitted from the corresponding sensor signal transmitters,

only one electric power transmitter is provided for commonly transmitting the electric operating power wirelessly to the plural electric power receivers, and

the electric power receiver supplies directly the sensors and the sensor signal transmitter with the electric operating power, and

the sensor signal receiver includes a single variable tuning circuit for varying to tune to each of natural frequencies transmitted respectively from the plural sensors and a switching element to switch among varying natural frequencies of the tuning circuit to select the natural frequencies one at a time on a time sharing basis.

17. (Currently Amended) A bearing assembly equipped with a wireless sensor unit, comprising:

one of a plurality of wireless sensor units that is mounted on a bearing,

wherein the plural wireless sensor units each include

a sensor to detect a parameter to be detected;

a sensor signal transmitter to transmit wirelessly a sensor signal outputted from the sensor; and

an electric power receiver to receive wirelessly an electric operating power required to drive the sensor and the sensor signal transmitter by supplying directly the sensors and the sensor signal transmitter with the electric operating power; and

wherein the plural wireless sensor units are operable to transmit to one common sensor signal receiver the respective sensor signals transmitted from the corresponding sensor signal transmitters and are also operable to receive wirelessly the electric operating power from one

common electric power transmitter through the respective electric power receiver, and
the sensor signal receiver includes a single variable tuning circuit for varying to tune to
each of natural frequencies transmitted respectively from the plural sensors and a switching
element to switch among varying natural frequencies of the tuning circuit to select the natural
frequencies one at a time on a time sharing basis.

18. (Currently Amended) A bearing assembly equipped with a wireless sensor,
comprising:

a plurality of sensors to detect respective parameters to be detected;

a sensor signal transmitter to transmit wireless sensor signals outputted from the
respective sensors; and

an electric power receiver to receive wirelessly an electric operating power required to
drive the sensors and the sensor signal transmitter,

wherein the plural wireless sensor units are operable to transmit to one common sensor
signal receiver the respective sensor signals transmitted from the corresponding sensor signal
transmitters, and

only one electric power transmitter is provided for commonly transmitting the electric
operating power wirelessly to the plural electric power receivers, and

the electric power receiver supplies directly the sensors and the sensor signal transmitter
with the electric operating power, and

the sensor signal receiver includes a single variable tuning circuit for varying to tune to
each of natural frequencies transmitted respectively from the plural sensors and a switching
element to switch among varying natural frequencies of the tuning circuit to select the natural
frequencies one at a time on a time sharing basis.

19. (Previously Presented) The bearing assembly as claimed in claim 16, wherein at
least one of the sensors mounted on the bearing is a rotation sensor including a multipolar
magnet, having a plurality of magnetic poles deployed in a direction circumferentially thereof,
and a magnetic sensor to detect the magnetic poles of the multipolar magnet.

20. (Previously Presented) The bearing assembly as claimed in claim 17, wherein at
least one of the sensors mounted on the bearing is a rotation sensor including a multipolar
magnet, having a plurality of magnetic poles deployed in a direction circumferentially thereof,
and a magnetic sensor to detect the magnetic poles of the multipolar magnet.

21. (Previously Presented) The bearing assembly as claimed in claim 18, wherein at least one of the sensors mounted on the bearing is a rotation sensor including a multipolar magnet, having a plurality of magnetic poles deployed in a direction circumferentially thereof, and a magnetic sensor to detect the magnetic poles of the multipolar magnet.

22. (Previously Presented) The bearing assembly as claimed in claim 19, wherein the magnetic sensor is a magnetoresistive sensor.

23. (Previously Presented) The bearing assembly as claimed in claim 20, wherein the magnetic sensor is a magnetoresistive sensor.

24. (Previously Presented) The bearing assembly as claimed in claim 21, wherein the magnetic sensor is a magnetoresistive sensor.

25. (Previously Presented) The bearing assembly as claimed in claim 16, wherein the sensor is disposed within a sealed space in the bearing, which is shielded from the outside, and the electric power receiver and the sensor signal transmitter are disposed outside the bearing.

26. (Previously Presented) The bearing assembly as claimed in claim 17, wherein the sensor is disposed within a sealed space in the bearing, which is shielded from the outside, and the electric power receiver and the sensor signal transmitter are disposed outside the bearing.

27. (Previously Presented) The bearing assembly as claimed in claim 18, wherein the sensor is disposed within a sealed space in the bearing, which is shielded from the outside, and the electric power receiver and the sensor signal transmitter are disposed outside the bearing.

28. (Currently Amended) A wheel support bearing assembly for rotatably supporting a vehicle wheel relative to a vehicle body structure, the wheel support bearing assembly comprising:

- an outer member having a plurality of outer raceways;
- an inner member having inner raceways aligned with the outer raceways;
- a plurality of rows of rolling elements interposed between the outer raceways and the inner raceways; and

one of a plurality of wireless sensor units mounted on the wheel support bearing assembly,

the plural wireless sensor units each including a sensor to detect a parameter to be detected, a sensor signal transmitter to transmit wirelessly a sensor signal outputted from the sensor and an electric power receiver to receive wirelessly an electric operating power required to drive the sensor and the sensor signal transmitter by supplying directly the sensors and the sensor signal transmitter with the electric operating power,

the plural wireless sensor units are operable to transmit the respective sensor signals to one common sensor signal receiver through the corresponding sensor signal transmitters and also operable to receive wirelessly the electric operating power from one common electric power transmitter through the electric power receiver, and

the sensor signal receiver includes a single variable tuning circuit for varying to tune to each of natural frequencies transmitted respectively from the plural sensors and a switching element to switch among varying natural frequencies of the tuning circuit to select the natural frequencies one at a time on a time sharing basis.

29. (Currently Amended) A wheel support bearing assembly for rotatably supporting a vehicle wheel relative to a vehicle body structure, the wheel support bearing assembly comprising:

- an outer member having a plurality of outer raceways;
- an inner member having inner raceways aligned with the outer raceways;
- a plurality of rows of rolling elements interposed between the outer raceways and the inner raceways;

- a plurality of sensors to detect respective parameters to be detected;
- a sensor signal transmitter to transmit wireless sensor signals outputted from the respective sensors;

- an electric power receiver to receive wireless an electric operating power required to drive the sensors and the sensor signal transmitter,

wherein the plural wireless sensor units are operable to transmit to one common sensor signal receiver the respective sensor signals transmitted from the corresponding sensor signal transmitters,

only one electric power transmitter is provided for commonly transmitting the electric operating power wirelessly to the plural electric power receivers, and

the electric power receiver supplies directly the sensors and the sensor signal transmitter

with the electric operating power, and

the sensor signal receiver includes a single variable tuning circuit for varying to tune to each of natural frequencies transmitted respectively from the plural sensors and a switching element to switch among varying natural frequencies of the tuning circuit to select the natural frequencies one at a time on a time sharing basis.

30. (Currently Amended) A wireless sensor system comprising:
a wheel support bearing assembly as defined in claim 28;
a sensor signal receiver for receiving the sensor signal transmitted from the sensor signal transmitter in the wheel support bearing assembly; and
an electric power transmitter for transmitting wireless the electric operating power to the electric power receiver;,
wherein the sensor signal receiver and the electric power transmitter are disposed in a tire house of the vehicle body structure, where the wheel support bearing assembly is installed, or disposed in a portion of the vehicle body structure, which is more distant from the tire house with respect to the wheel support bearing assembly.

31. (Currently Amended) A wireless sensor system comprising:
a wheel support bearing assembly as defined in claim 29;
a sensor signal receiver for receiving the sensor signal transmitted from the sensor signal transmitter in the wheel support bearing assembly; and
an electric power transmitter for transmitting wireless the electric operating power to the electric power receiver;,
wherein the sensor signal receiver and the electric power transmitter are disposed in a tire house of the vehicle body structure, where the wheel support bearing assembly is installed, or disposed in a portion of the vehicle body structure, which is more distant from the tire house with respect to the wheel support bearing assembly.